

REMARKS

The application has been amended as needed so as to place it in condition for disposal at the time of the next Official Action.

In the course of this revision, a new Abstract of the Disclosure has been submitted, which is believed to comply with 37 CFR §1.72(b) and Section 608.01(b) of the Manual of Patent Examining Procedure (MPEP) .

In addition, subject headings have been inserted at the appropriate locations throughout the specification in a manner consistent with the preferred guidelines set forth at 37 CFR §1.77 and Section 601 of the MPEP.

Claim 22 was rejected under 35 USC §102(b) as being anticipated by GRAY 5,283,050.

Claims 1-16 and 18-21 were rejected under 35 USC §103(a) as being unpatentable over LEHMAN et al. 5,908,492 in view of BOSQUAIN et al. 4,541,851. The Official Action concludes that it would have been obvious to one of ordinary skill in the art to have used annular beds as taught by BOSQUAIN et al. in the LEHMAN et al. system because the annular shape would allow greater area for gas purification and hence would increase the efficiency of the separation process.

Claims 23-26 were rejected under 35 USC §103(a) as being unpatentable over GRAY in view of BOSQUAIN et al. It is

concluded that it would have been obvious to one of ordinary skill in the art to have used valves as taught by BOSQUAIN et al. on the pipes of the GRAY apparatus, because it is necessary to contain the reaction and chamber contents and hence isolate them somewhat from the external environment.

Claims 27-30 were rejected under 35 USC §103(a) as being unpatentable over GRAY and BOSQUAIN et al., as applied above, and further in view of LEHMAN et al. The tertiary reference to LEHMAN et al. is relied upon as disclosing the use of a gas-filled cavity at the upper end of a cylindrical shell to remain open in order to allow equilibration of pressure. It is concluded that it would have been obvious to one of ordinary skill in the art to have created an open space as taught by LEHMAN et al. in the GRAY apparatus, since the same would minimize the level of stress generated during the decompression and compression cycles, and would result in a longer life for the adsorbent bed.

Reconsideration of the above rejections is respectfully requested for the following reasons.

By the present amendment, it will be seen that former independent claims 1 and 22 have been canceled, and replaced with new independent claims 34 and 55. A new independent claim 70 has also been added, while dependent claims 35-54 and 56-69 correspond to former claims 2-21 and 23-33.

Before turning to a discussion of the applied prior art, a brief review of the present invention would seem beneficial.

The present invention relates to process for treating a gas by means of an active packing, in which a treatment cycle is implemented that comprises at least one treatment phase, in the course of which the gas to be treated is caused to circulate through the packing, and at least one phase for regenerating the packing. Other phases of such a cycle may be the pressurization or depressurization of the active packing.

In such processes, the packing is contained in a space delimited between two concentric cylindrical grids. The gas to be treated passes through the annular bed and in a generally radial manner in a first direction, whereas a regeneration gas traverses the bed in a generally radial manner in the opposite direction.

To assure that the gas flows effectively traverse the totality of the packing, it is necessary to provide at the top of the bed a device for preventing any bypass or short circuit. This may take the form, for example, of an annular guard of adsorbent, which may be delimited by two solid cylindrical walls connected in a sealed manner to the upper dome of the reactor. This guard should be of enough material to remain between the two solid walls after packing of the adsorbent, which is produced

after a certain number of cycles of operation due to periodic dilation/contraction phenomena of the grids, of thermal origin.

As is explained in the paragraph bridging pages 2 and 3 of the original specification, the guard constitutes a space in which the gaseous circulation is not controlled. In this space, certain zones may be poorly regenerated in pressure swing adsorption processes, either because part of the heat of the regeneration gas heats an adjacent wall and does not serve to regenerate the adsorbent, or more fundamentally, because the heat of regeneration is going to be lost in regions where there is an overabundance of adsorbent, or also because the total regeneration flow rate is insufficient to assure a good regeneration. In addition, other edge effects may be produced, which is to say that other marginal regions of the packing may be formed in a manner unfavorable with respect to flow of at least one of the circulating fluids, which leads to using an excessive mass of adsorbent.

The present invention is directed to a method and a related reactor for limiting the detrimental losses due to the local flow bypasses in a marginal edge region of a gas treating packing or bed, more particularly in the radial bed vessels.

In order to do this, the flow of gas circulating in the marginal region of the packing is caused to locally increase or decrease temporarily during a phase of the treatment cycle,

typically by establishing a fluid communication between the marginal region and a point (either inside or outside the vessel) at a pressure different from the pressure in the packing in the vicinity of the marginal region.

It is respectfully submitted that the above-claimed characteristic feature is neither disclosed, nor suggested by any of the applied references alone, or in combination.

As is admitted in the Official Action, the GRAY reference discloses a purely static catalyst reactor devoid of any inner or outer valves or the like. Consequently, there is simply no possibility nor motivation or suggestion to temporarily modify locally the flow of gas within the vessel.

The same is true for the LEHMAN et al. reference, which also discloses a purely static thermally insulated adsorber with no fluid flow modification means provided for locally and temporarily modifying fluid flow in a marginal region of the packing.

The third applied reference to BOSQUAIN et al., which is mentioned on page 3 of the specification under the heading "Background of the Invention", merely discloses a reactor with concentric annular beds.

It is respectfully submitted that when considering the applied references collectively, there would be no reason, motivation or suggestion to combine the same in the manner

necessary to achieve the herein claimed invention. Indeed, the combined teachings of these references would not have resulted in a process or reactor for treating a gas by means of an active packing contained in a vessel so as to achieve the herein claimed characteristic feature of limiting the detrimental losses due to local flow bypasses in a marginal edge region, as is recited in applicants' claims.

In view of the present amendment and the foregoing remarks, therefore, it is believed that this application has been placed in condition for allowance. Reconsideration and allowance on the basis of new claims 34-70 are accordingly earnestly solicited.

In the event that there are any questions relating to this amendment or to the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that the prosecution of this application may be expedited.

Please charge the fee of \$72 for the four extra claims of any type added herewith to Deposit Account No. 25-0120.

Application No. 09/809,101
Amdt. dated April 26, 2004
Reply to Office Action of February 2, 2004
Docket No. 0503-1074

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17.

Respectfully submitted,

YOUNG & THOMPSON

Benoit Castel

Benoit Castel, Reg. No. 35,041
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

BC/lrs

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APPENDIX:

The Appendix contains the following item:

- new Abstract of the Disclosure